**Wasting Water Lab Group members\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Materials Needed:** Grid Paper, Paper Cups, Paper Clips, Graduated Cylinders, Timer, and handout

**Procedure:**

1. Get in groups of three:
   1. One person will record the data
   2. One person holds the cup over the graduated cylinder, and at the beginning of the experiment, makes a hole in the bottom of the cup
   3. One person reads the measurement **every 5 seconds.**
2. Pour water into the cups, make a hole in the bottom, and hold your finger over the hole until the experiment begins.
3. When the timer says to begin, remove your finger and let the water start dripping. BE PREPARED! **Every five seconds**, measure the water level in the graduated cylinder and record the data in the table.
4. At the end of 60 seconds the experiment is over. Make sure you have recorded all of the data in the table. Pour any remaining water into the graduated cylinder.
5. Graph your data with time on the x-axis and mL on the y-axis.
6. Graph and analyze your data using Excel and make predictions. This will require the computer.

**Water Drip Investigations**

1. Find the difference between the number of mL at 5 seconds and the number of mL at 0 seconds. Divide that number by 5 to get the average change in mL per second for the time frame of 0 to 5 seconds.
2. Find the difference between the number of mL at 10 seconds and the number of mL at 5 seconds. Divide that number by five to get the average change in mL per second for the time frame of 5 to 10 seconds.
3. Find the average change in mL per second for the time frame 0 to 60 seconds.
4. Use your answer to #3 as the slope of your line. Use the value for mL at t=0 for your y-intercept. Write the equation of your line.
5. Graph your data by hand on the graph paper and then draw your line.
6. Put your data into columns A and B on a spreadsheet. Find the linear regression line for your data.
7. Have the computer draw a scatter plot and line of best fit for your data.
8. Compare your computer generated line with your answer to #4
9. Predict how much water will leak in 10 seconds.

|  |  |
| --- | --- |
| Time in Seconds | Amount of Water |
| 0 |  |
| 5 |  |
| 10 |  |
| 15 |  |
| 20 |  |
| 25 |  |
| 30 |  |
| 35 |  |
| 40 |  |
| 45 |  |
| 50 |  |
| 55 |  |
| 60 |  |

Items to submit: Graph of data by hand

Answers to the questions

Email with attachment of spreadsheet with graph and best fit line.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Rubric** | 8 pts. | 6 pts. | 4 pts. | 0 pts |
| Data graphed correctly by hand with labels | All points plotted correctly and both x-axis and y-axis labeled correctly | All points plotted correctly but problems with labels. | Some points plotted correctly and x and y axis labeled correctly. | Points are plotted incorrectly. |
| Question 1 | Correct difference and correct average | Correct average but incorrect difference | Correct difference but incorrect average | Neither correct. |
| Question 2 | Correct difference and correct average | Correct average but incorrect difference | Correct difference but incorrect average | Neither correct. |
| Question 3 | Average change calculated correctly. | Average change calculated with a minor mistake | Average change calculated with a major mistake | No work No credit |
| Question 4 | Correct equation | Correct formula used but a minor mistake was made | Equation calculated with a major mistake. | No work. No credit. |
| Question 8 | Thoughtful answer with correct grammar usage. | Correct grammar usage | Minor grammar mistakes | Not a sentence. |
| Question 9 | Thoughtful prediction with correct grammar usage. | Correct grammar usage | Minor grammar mistakes | Not a sentence. |
| Spreadsheet data | All data correctly entered | Data entered with minor mistake | Data entered with major mistakes | No data |
| Computer graph | Points plotted correctly with labels | Some points plotted correctly with labels. | Incorrect labels with some points plotted correctly. | No graph |